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EDITORIAL ON STANDARDIZATION OF POWER LOSSES IN USSR

The current national-economy plan lays great stress on problems related to the immediate realization of measures to cut down the norms governing consumption of materials, fuels, and power for heat and electricity; to examine the technology and increase the efficiency of machinery, plants, and mechanisms. These measures are laying more and more stress on new and progressive methods for improving technological processes, improved machinery and combined units, efficient utilization of equipment, and curtailing unnecessary losses in production.

In industrial power engineering a great effort is being made to economize on all forms of power and to increase efficiency by utilizing secondary power resources, by reducing power losses, and by making more efficient use of equipment and power supplies.

The organizational and technical measures approved in 1950 for these purposes, based on progressive experience in recent years, define the concrete tasks connected with further advances in power economy in industrial enterprises.

Advances in technological processes, modernization of the working conditions of technological equipment and development of new production methods are the foundation for efficient and economical utilization of fuel, thermal energy, water, compressed air, and electric power.

Among the measures contemplated to fulfil these plans are the electric spark method of metalworking, new methods of electric welding, anode-mechanical metal cutting, application of high boiling-point heat-carrying media, recovery of energy, utilizing the heat of reaction in chemical processes, new types of lighting -- fluorescent tubes, application of inductive heating, industrial use of infrared irradiation, improvements in the geometry of cutting tools, organizing production-line techniques, adopting high-speed operational methods, improving electric supply systems, introducing automatic and telemechanical devices, new types of insulation and power equipment, improved relay protection, application of hf currents and many other measures.

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Furthermore, the plan for 1950 defines the fundamental paths and directions for a continuous program of power economy. It provides for lowering the norms of specific power consumption, by a percentage of 1.6 to 6.9, fixed by the various industrial ministries for concrete cases.

Work along these lines in 1949 was very satisfactory and proved the existence of untouched reserves. That the developments envisaged are possible is demonstrated by the fact that Soviet power engineers, technologists, mechanics, and production specialists, inspired by socialist competition, have not only adapted themselves to the new lower norms, but have achieved additional economies amounting to hundreds of millions of kilowatt-hours of electric power.

Under present conditions, with the constant growth of technical sciences and improvements in labor organization, the establishment of proper norms is increasingly important. The norms for specific power consumption do not merely provide criteria with which to evaluate the work of an enterprise on the basis of its power consumption but, in addition, facilitate and stimulate new techniques and more economical methods of utilizing equipment and labor. They also aid in drawing up future plans for power supply to industrial areas and enterprises. They must, therefore, be progressive and adapted to contemporary levels of advanced technology and production.

To be effective, the norms for specific power consumption must be based on specific data on power balances and equipment and on calculations which envisage future operational improvements. Mechanical losses by friction in machines, heat losses in electric furnaces, losses in electrochemical processes, in current collectors, lines, etc., must be taken fully into account in the established norms.

The statistical method of fixing norms does not stimulate efforts to save power or show the wastefulness of nonproductive power consumption since it automatically includes in the basic norm of specific consumption all shutdowns and disturbances of normal operation, unnecessary losses and lack of improvement in the technology of productive processes.

The practical experience of industrial enterprises, the results of special investigations, and the work of research laboratories and institutes have often demonstrated the growing importance of fixing norms for power consumption and, at the same time, revealing their defects and mistakes.

The Kirov Ural Plant has adopted a method of processing tractor parts by high-frequency currents, which permitted a considerable cut in the norm of specific power consumption per unit of production. For example, where 12.6 kw-hr were consumed in processing one final drive gear in ordinary thermal furnaces, the actual specific consumption for this piece using the new method would amount to 5.4 kw-hr. The new method has other advantages; it shortens the processing time, increases the life of the piece; expensive chrome-nickel steel can be replaced by simple steel; allowances for mechanical processing and the number of operations required for thermal processing are reduced. Consequently, the new method not only economizes on energy in the plant itself, but also in related industries, particularly steel mills.

Recently, the anode-mechanical method of metal cutting has been introduced in many of our industrial enterprises. Usually the cutting of blanks takes a great deal of time in the production cycle of any metal working enterprise. Special difficulties and great power consumption are encountered in cutting heat-resistant, high-speed stainless and other special steels. The anode-mechanical method is particularly effective for this purpose.

In the Leningrad Mechanical Plant imeni Stalin the norm for cutting a 40 x 55-mm bar of E1-123 steel by the mechanical method was fixed at 0.6 kw-hr. The anode-mechanical method reduced this norm to 0.3 kw-hr. In the VARZ Plant of the Ministry of Transport Machine Building the norm for specific power consumption was fixed at 1.3 kw-hr for cutting bars of GS-50 steel, 107-mm in diameter, on a lathe. On converting to the anode-mechanical method the norm was reduced to 0.75 kw-hr for the same piece.

A new method of metal cutting on an electric spark machine has also produced remarkable results. The Laboratory of the Odessa Polytechnic Institute made a comparative study of the efficiency of this method. In cutting an 80 x 80-mm bar of tool steel with an ordinary jig saw, one cut uses 1.95 kw-hr of electric power, while the electric spark machine uses only 0.58 kw-hr.

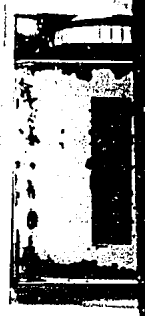
Any increase in the life of a tool is of interest to the enterprise which uses it. Capping tools by the electric spark method results in a considerable saving both in state funds and in electric power. The advantages of this method are: simplicity of the electric system, compactness of construction and comparative low cost of the equipment.

There are, however, serious defects in established norms. In the Kolomensk Locomotive Plant imeni Kuybyshev more than 40 percent of the total power consumption is accounted for by the operation of the compressed air equipment. For many years, consumption for this purpose did not exceed the norms. Outward appearances were excellent, but in checking the use of compressed air, inadmissible losses were discovered. For example, as a result of this investigation, it was discovered that the actual air consumption by the hammers was 1.5-2 times the normal amount; that there were 213 outlets for compressed air not needed for production, and these outlets only caused losses. When these defects were eliminated, the consumption of compressed air was greatly reduced; this, in turn, reduced the total consumption of power for the compressors.

This example proves that it is not sufficient to fix norms for producing compressed air, oxygen, for water supplies, etc. It is also necessary to establish individual norms for the specific consumption of compressed air, oxygen, and water required for production processes. Otherwise, the savings in power will be fictitious and the power indexes will not reflect the true position of the complex utilization of power resources in enterprise.

Cases where economies are effected by comparison with existing norms, established without reference to possible and necessary changes in obsolete wasteful methods of operation or improvements in technological processes, must also be considered fictitious economies. Norms for specific consumption fixed by statistical data on past periods of operation give a false impression and do not encourage new and more economical procedures. For example, from year to year, the Ministry of the Food Industry fixed power consumption norms for the Moscow Brewery imeni Badayev and included in this norm unnecessary losses in converting power which amounted to 9 or 10 percent of the total consumption. The power supply system in this plant was obviously defective. Since dc motors had been installed in the workships, the conversion of alternating to direct current annually consumed more than 100,000 kw-hr. There are no technological reasons for installing dc motors, and such motors should be replaced by ac motors. Not only did the plant workers put up with this very abnormal situation, but the ministry, which had established this excessive norm, encouraged this technically unsound scheme of electric supply.

According to calculations, a norm of not more than 110 kw-hr per ton of malt production should have been established for this enterprise. In 1949, the ministry authorized a norm of 124 kw-hr per ton and raised it to 125 kw-hr in 1950. The actual consumption amounted to 123.9 kw-hr per ton in 1949 and to 123 in January 1950. The result was a fictitious economy and a setback to progressive methods of fixing norms for power consumption.



Unfortunately such examples of misplaced generosity on the part of certain industrial ministries in fixing norms for departmental enterprises are not rare. The norms have been raised for the Moscow Tube Plant, the AREMZ Plant, Parkomenko Plant, Komintern Factory, the Ural Electrical Equipment Plant, the Gorlovo Plant imeni Kirov, and others.

Individual industrial ministries have been obliged to make radical revisions in their established norms, but the control agencies, among them the Factory and Plant Inspectorate for Electric Supply, should exert greater control over the authorization of new norms for power economy.

To establish proper norms and determine the present situation of power consumption in enterprises, exact accounts of power expenditure must be kept and systematically audited. Separate accounts must be kept for individual workshops and large current consumers. Very large power-consuming units (rolling mills, electric furnaces, compressors, pumps, etc.) should have separate meters.

In recent years, good but too little work has been done on the establishment of norms by research institutes and plant laboratories. Many enterprises have conducted tests on machinery and worked out power characteristics expressing the relation between power consumption and productive output per unit of time. In the light of these studies, the instructions on fixing norms, published 5 years ago, should be revised. Scientific and experimental research on these lines should be continued. On the basis of such research and with better accounting and controls, power economy should reach a level corresponding to modern techniques and production.

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